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Computational statistics (3ST2010)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en statistique	Cours: 4 ph	controle continu: 1	6

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Printemps

Equipe enseignante:

Dr. Alina Matei
Institut de Statistique
Av. de Bellevaux 51, CH-2000 NEUCHÂTEL
Office phone : +41 32 718 13 27 - email : alina.matei@unine.ch

Objectifs:

Master the theoretical and practical aspects of the computer based methods in statistics. At the end, the students should be able to apply the methods presented in this course to their statistical analyses.

Contenu:

The course introduces a number of methods that make use of computer resources to do statistical analysis and modeling. Some of these methods use resampling or repeated simulations to approximate standard errors, confidence intervals, p-values of statistical tests, etc. The course emphasizes the practical side of the methods, by illustrating the theoretical issues with practical applications using the R software. The course includes three parts:

- Random variable generation,
- Elements of Monte Carlo statistical methods,
- Resampling methods for estimating and testing (jackknife, bootstrap, resampling methods for model assessment and selection).

Forme de l'évaluation:

A) First attempt

CA graded: The assessment includes 4 parts: 3 tests on computer during the semester and 1 project at the end of the semester (the project should be presented in the classroom). Each part represents 25% of the final grade.

Attendance

The students must attend each of the previous 4 parts of the assessment.

B) Second attempt

Retake exams

- 4h exam.

Retake exam deadline

- The exam will be organized by the teacher in agreement with the student, before the end of the corresponding exam session (not in Pidex).

Documentation:

- G. H. Givens, J. A. Hoeting (2007), Computational Statistics, Wiley.
- J.E. Gentle (2000), Random number generation and Monte Carlo methods, Springer.
- B. Efron, R. Tibshirani (1993), An Introduction to the bootstrap, Chapman and Hall.

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- A.C. Davison, D.V. Hinkley (1997), Bootstrap Methods and their Applications, Cambridge University Press.
- C.P. Robert, G. Casella (2004), Monte Carlo statistical methods, Springer.

Pré-requis:

Introduction in probability, inferential statistics, knowledge of R.

Forme de l'enseignement:

- 6 ECTS credits
- Compulsory course for master in statistics
- Spring Semester
- Course+practical exercises on computer: 4 hours